Model of the Determination of the Feasibility of Making Loans to Members at HIPPATAS Credit Cooperative – Tasikmalaya

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Abstract

The objective of this study is to analyze the effect of some factors on the feasibility of making loans to members and develop its model at at HIPPATAS Credit Cooperative - Tasikmalaya. Most of the members run small businesses. They use the loan to increase working capital of their businesses. The object of this study is at HIPPATAS Credit Cooperative - Tasikmalaya. This study uses 5 variables consist of 1 dependent variable (feasible or not feasible) and 4 independent variables namely, principal (X1), loan payment (X2), family size (X3) dan age (X4). This study uses 141 samples and discriminant model analysis. The results show that 2 variables have effects on the feasibility of at HIPPATAS Credit Cooperative - Tasikmalaya, namely, principal and family size, but loan payment and age do not have affect on it.

Keywords :Loan, principal, loan payment, family size, and age.

1 Introduction

Micro and small enterprises has proved that they have contributed significantly to the national economy of Indonesia both in normal economy and economic crisis. Their contributions are (1) they employ more labors than medium and large enterprises; (2) they are sources of income; and (3) they are sources of GDP growth and export manufacturing products.

After financial crisis at 2008, Indonesian economy has been growing slowly. The condition can be seen by the increasing of GDP yearly and the number of bank and non bank institutions.

All financial institution (banks and non banks including cooperatives) compete each other to attract the members to borrow the money. They set competitive requirements to the members for applying working capital loan. The amount of loan that will be approved by financial institutions depends on some variables. They are age of the members; number of children; the amount of loan, loan payment, value of collateral; and other administrative requirements. Gitman [Lawrence, 1991] explain that credit managers often use the five C's of credit to focus their analysis on the key demensions oh an applicant's creditworthiness. Each of thewe five demensions are character, capacity, capital, collateral, and conditions.

One of cooperatives that provide loans for its member is HIPPATAS Credit Cooperative – Tasikmalaya. It sets the requirements for the members that apply for the loan. Those requirements set by cooperative did not mean that all debtors paid the loans on time, but some othe them did not pay on time. It resulted in decreasing company's revenues, increase the operational expenses, and at the end it decreased its profits.

To solve and anticipate the unpaid loan in the future, the company can not tighten the terms of working capital loan because it will lead the members reluctant to apply the loan and will turn to other financial institution that provide more untight terms of credit.

Based on these evidences, the company must develop prediction model of the feasibility of Making Loans to Members at HIPPATAS Credit Cooperative – Tasikmalaya as early selection for new members that apply for working capital loan to reduce credit risk.

The objective of the research is to develop prediction model to select the feasible members that apply working capital loan at HIPPATAS Credit Cooperative – Tasikmalaya

2 Research Method

The samples of this research are debtors of HIPPATAS Credit Cooperative – Tasikmalaya with the amount of 141 debtors which consists of 73 feasible debtors and 68 unfeasible debtors.

Table 1: Number of Labors Employed in Micro Entreprises Based on Economic Sectors 2007-2008

No.	Economic Sectors	Number and Year (Labors)		Trend	
		2007	2008	Number	%
1.	Agriculture, Livestock, Forestry, and Fishery	60,321	66,780	6,459	10.71
2.	Mining and Exploration	26,662	28,762	2,100	7.88
3.	Manufacturing	1,119,338	1,145,066	25,728	2.3
4.	Electricity, Gas and Clear Water	19,832	19,917	85	0.43
5.	Buildings	130,489	137,555	7,066	5.42
6.	Trade, Hotel and Restaurant	1,595,918	1,672,351	76,433	4.79
7.	Transportation and Communication	154,228	146,336	8,892	5.77
8.	Finance, Leasing, and Consultant	308,165	313,921	5,756	1.87
9.	Others	450,042	462,683	12,641	2.81

Source: Central Statistic Bureau

We uses 5 variables to develop prediction model of the debtors selection. The dependent variable is feasible or not feasible, namely, code 0 is feasible group and 1 is unfeasible group. The independent variables used in this study are amount of loan; loan payment; the number of children; age of the member. The definition of each variable are as follows:

The study uses the analysis of discriminant model as follows:

$$Y = ß_0 + ßX_1 + ßX_2 + ßX_3 + ßX_4$$

- Dependent variabel (Y) is categorical or nominal data. It consists of code 0 for feasible member and code 1 for unfeasible member). The model called Two-Group Discriminant Analysis.
- Independent variabel are the amount of loan (X_1), loan payment (X_2), number of children (X_3) dan age of member (X_4).

Cut off score is used to find whether a members is in feasible group or unfeasible group.

$$Z_{CU} = \frac{N_A Z_B + N_B Z_A}{N_A + Z_B}$$

- Z_{CU} = Critical number as cut off score
- $N_A$dan N_B= Number of sample in group A and B. In this study is feasible group and unfeasible group

Table 2: Operational Variable Definition

Variabel	Label	Definition
Dependent	Credit	Catagory (0 Feasible and 1 Unfeasible)
Independent	Value of loan	The amount of loan
Independent	Loan payment	The amount of interest and principal paid per period (monthly)
Independent	The number of children	Number of children of member
Independent	Age	The age of member

- $Z_A$danZ_B = Centroid number in group A and B

3 Results and Discussion

3.1 Descriptive statistic

The amount of samples are 141 debtors. The description of debtors as follows3:

Table 3: Descriptive Statistics

	N	Range	Minimum	Maximum	Mean	Std. Deviation
The amount of loan	141	14,000,000	1,000,000	15,000,000	7,246,454	4,432,327
Loan payment	141	1,166,667	83,333	1,250,000	459,255	234,548
Number of children	141	5	1	6	2.929078014	0.907472078
Age	141	40	25	65	41.80851064	10.21057917
Valid N (listwise)	141					

3.2 Prediction Model

First step in the discriminant analysis is to test whether all independent variables are different each other based on dependent variable. By using tests of equality of goup means, the results are as follows4:

Table 4: Test of Equality Group Means

	Wilks' Lambda	F	df1	df2	Sig.
L AMOUNT	.863	22.103	1	139	.000
PAYMENT	.903	14.923	1	139	.000
CHILDREN	.943	8.363	1	139	.004
AGE	.982	2.591	1	139	.110

Age variable has Sig value (0.11) more than 0,05. It means that this variable has no difference between groups. Variables of amount of loan,

loan payment and number of children have sig. value less than 0,05. It means that these variables have difference between groups. It can be concluded that there are three variables that have difference significantly for discriminant group, namely amount of loan, loan payment, dan number of children. It means that whether a company approving a capital working loan to a member or not is affected by these variables.

Box's M test variance of each variable and the results are as follows5:

Table 5: Test Results

Box's M		2.352
F	Approx.	.772
	df1	3
	df2	4.153E6
	Sig.	.510

Tests null hypothesis of equal population covariance matrices.

Significant value is 0.510, more than 0.05. It means that group covariance matrices are similar.

The second step is to develop discriminant model. Based on the dependent variable that has categorical value (two groups), the study shows group statistics as follows6:

Table 6: Group Statistics

Y		Mean	Std. Deviation	Valid N (listwise) Unweighted	Weighted
0	Loan amount	5,550,000.00	3,851,380.55	68	68
	Loan payment	384,000.00	218,567.60	68	68
	Number of children	2.71	0.85	68	68
	Age	40.38	10.33	68	68
1	Loan amount	8,830,000.00	4,376,722.86	73	73
	Loan payment	529,000.00	228,352.06	73	73
	Number of children	3.14	0.92	73	73
	Age	43.14	9.99	73	73
Total	Loan amount	7,250,000.00	4,432,327.05	141	141
	Loan payment	459,000.00	234,548.46	141	141
	Number of children	2.93	0.91	141	141
	Age	41.81	10.21	141	141

Based on Group Statistics that contain mean and standard deviation of each category, it can be concluded that:

1. Cooperative members in feasible category have average loan amount of Rp 5,550,000,00 with standard deviation of 3,851,380.55, but those who in unfeasible category have average loan amount of Rp 8,830,000.00 with standard deviation of 4,376,722.86
2. Cooperative members in feasible category have average loan paymentof Rp 384,000,00 with standard deviation of 218,567.60, but those who in unfeasible category have average loan payment of Rp 529,000.00 with standard deviation of 228,352.06
3. Cooperative members in feasible category have average number of children of 2.71 with standard deviation of 0.85, but those who in unfeasible category have average number of children of 3.14 with standard deviation of 0.92
4. Cooperative members in feasible category have average age of 40.38 with standard deviation of 10.33, but those who in unfeasible category have average age of 43.14 with standard deviation of 9.99
5. There are 68 members that are feasible (approved) in getting working capital loan and member that are unfeasible (unapproved) in getting working capital loan.

Stepwise process will rank the variables based on the significant of F to remove and the results are as follows7:

Table 7: Variables in TheAnalysis a, b, c, d

Step	Entered	Min. D Squared Statistic	Between Groups	Exact F Statistic	df1	df2	Sig.
1	LOAN AMOUNT	.628	0 and 1	22.103	1	139.000	6.155E-6
2	NUMBER OF CHILDREN	.890	0 and 1	15.549	2	138.000	8.130E-7

At each step, the variable that maximizes the Mahalanobis distance between the two closest groups is entered.

a. Maximum number of steps is 8.

b. Minimum partial F to enter is 3.84.

c. Maximum partial F to remove is 2.71.

d. F level, tolerance, or VIN insufficient for further computation.

The table 7shows that:

- Step 1, Loan amount is the first variable that included in the discriminant model as it has Sig. of F to remove less than 0.05.
- Step 2, Number of children is the second that included in the discriminant model as it has Sig. of F to remove less than 0.05.

Canonical Correlation measures the closeness of the relationship discriminant score between groups. Table 8below shows the results.

Table 8: Summary of Canonical Discriminant Functions Eigenvalues

Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	.225[a]	100.0	100.0	.429

a. First 1 canonical discriminant functions were used in the analysis.

Based on 8canonical correlation value (0.429), the result shows that the relationship between groups is close enough.

Structure Matrix table explain the correlation between independent variables and developed discriminant function.

Table 9: Structure Matrix

	Function
	1
L_AMOUNT	.840
LOAN PAYMENT[a]	.628
NUMBER OF CHILDREN	.517
AGE[a]	.196

Pooled within-groups correlations between discriminating variables and standardized canonical discriminant functions Variables ordered by absolute size of correlation within function.
a. This variable not used in the analysis.

Pooled within-groups correlations between discriminating variables and standardized canonical discriminant functions Variables ordered by absolute size of correlation within function.

The results of cononical discriminate function coefficients are as follows10:

Table 10: Canonical Discriminant Function Coefficient

	Function
	1
LOAN AMOUNT	0.000000207
NUMBER OF CHILDREN	0.614
(Constant)	-3.300

Unstandardized coefficients

Based on the table, the discriminate function are:

$_Z$**Score = -3.300 + 0.000000207 Loan Amount + 0.614 Number of children**

After develop the discriminate function, the next step is to make a classification dan the results as follows11:

On the orginal line, it indicates that the members in the early data are feasible and the number of members that are still in feasible group based on discriminant function classification are 49 members, and those that in the early in feasible group move to unfeasible group with the amount of 19 members.

Based on the unfeasible group, thare are 51 members that are still in the feasible group and there are 22 members move to feasible group.

Table 11: Classification Results b, c

		Y	Predicted Group Membership 0	1	Total
Original	Count	0	49	19	68
		1	22	51	73
	%	0	72.1	27.9	100.0
		1	30.1	69.9	100.0
Cross-Validated[a]	Count	0	49	19	68
		1	28	45	73
	%	0	72.1	27.9	100.0
		1	38.4	61.6	100.0

- *a. Cross validation is done only for those cases in the analysis. In cross validation, each case is classified by the functions derived from all cases other than that case.*
- *b. 70.9% of original grouped cases correctly classified.*
- *c. 66.7% of cross-validated grouped cases correctly classified.*

Based on the table, the accuracy of the prediction model are (49 + 51) / 141 = 0,709 atau 70.9 % .

4 Conclusion and Implication

4.1 Conclusion

There is a significantly different between groups who are feasible and unfeasible to be approved in getting working capital loan. Based on the developed discriminate model, the variables that affects on approving working capital loan at HIPPATAS Credit Cooperative – Tasikmalay are loan payment and number of children, while variables that does not affect on approving working capital loan HIPPATAS Credit Cooperative – Tasikmalay are loan payment and age of the member. The accuracy of prediction model is 19.9 percent.

4.2 Implication

HIPPATAS Credit Cooperative – Tasikmalay can apply the prediction model as early selection for a member that apply for working capital loan in order to have a decision whether a member will be approved or not. For further research, it may include more independent variables in order to get a more accurate prediction model.

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